



# ACCESSORIES for TEST RECEIVER ESH2 and the programmable TEST RECEIVER ESH3

## APPLICATIONS

- CURRENT MEASUREMENTS
- HIGH-IMPEDANCE VOLTAGE MEASUREMENTS
- FIELD-STRENGTH MEASUREMENTS
- RADIO INTERFERENCE MEASUREMENTS TO CISPR, VDE, MIL, VG

## Current measurements

The Clamp-on RF Current Probe ESH2-Z1 to VDE 0876 is especially suitable for selective and broadband measurements of very low and very high RF currents in electrical conductors. It is shielded against electrostatic effects and has opening jaws to clamp around the conductor.

## Specifications

<u>Clamp-on RF Current Probe ESH2-Z1</u>	338.3516.52
Frequency range	100 kHz to 30 MHz
Measurement range with ESH2/ESH3: (200 Hz IF bandwidth, average detection)	
lower limit (frequency-dependent)	about -30 dB ( $\mu$ A)
upper limit	+120 dB ( $\mu$ A)
Transfer admittance	1 S
Conversion ratio in dB *)	0 dB related to 1 A/V
Error of conversion ratio	< 1 dB
Maximum current	
at $f > 10$ kHz	1 A
at $f < 500$ Hz	50 A
Max. diameter of line to be measured	13.5 mm
Operating temperature range	-10 to +55°C
Storage temperature range	-25 to +70°C
RF connector	BNC plug
Termination	50 $\Omega$
Length of connecting cables	1 m
Coding	12-pole Tuchel-type plug
Dimensions (diameter/height)	55 mm x 20 mm
Weight	0.4 kg

## Accessories supplied:

1 Manual

\*) Indication on ESH2 and ESH3 is corrected automatically

## High-impedance voltage measurements

It is recommended to use probes for high-impedance measurements e.g. when measuring narrow-band wanted signals on lines or narrow- or broadband unwanted signals at the receiver input or in antenna cables. The probes are equipped with high-pass filter elements for separating AC supply voltages.

When measuring AC voltages in the frequency range from 10 kHz to 30 MHz, the Active Probe ESH2-Z2 should be used on lines which are not carrying AC supply voltage.

The Passive Probe ESH2-Z3 is intended for measuring radio noise voltages on high level lines, for instance on lines carrying AC supply voltages.

## Specifications

<u>Active Probe ESH2-Z2</u>	299.7210.52
Frequency range	10 kHz to 30 MHz
Voltage division ratio *)	10 dB
Error of voltage division ratio ( $Z_{out}$ of source 50 $\Omega$ )	< 1 dB
Measurement range with ESH2/ESH3: (200 Hz IF bandwidth, average detection)	
lower limit (frequency-dependent)	about -20 dB ( $\mu$ V)
upper limit	120 dB( $\mu$ V)
Max. Input Voltage	$\pm 10$ V
Input impedance	118 k $\Omega$ $\pm 5\%$ shunted by 8 pF
Supply voltage	+10 V $\pm 1$ V / -10 V $\pm 1$ V
Current consumption	about $\pm 15$ mA
Operating temperature range	-10 to +45°C
Storage temperature range	-25 to +70°C
Length of connecting cables	1.5 m
RF connector	BNC plug
Termination	50 $\Omega$
Supply and coding	12-pole Tuchel-type plug
Weight	0.2 kg

## Accessories supplied:

1 Manual	
1 Kit of accessories	241.0613.02
1 Probe tip	241.0913.02

\*) Voltage indication on ESH2 and ESH3 is corrected automatically

<u>Passive Probe ESH2-Z3</u>	299.7810.52
Frequency range	10 kHz to 30 MHz
Voltage division ratio*)	40 dB
Error of voltage division ratio ( $Z_{out}$ of source: 50 $\Omega$ )	< 1 dB ( $f = 30$ kHz to 30 MHz) < +1/-2 dB ( $f = 10$ kHz to 30 kHz)
Measurement range with ESH2/ESH3 (200 Hz IF bandwidth, average detection)	
lower limit (frequency dependent)	about +10 dB ( $\mu$ V)
upper limit	154 dB ( $\mu$ V)
Input impedance (terminated into 50 $\Omega$ )	2425 $\Omega$ $\pm$ 5% shunted by 6 pF
Maximum input voltage	
at $f < 500$ Hz	250 V
at $f = 10$ kHz to 30 MHz	50 V
Operating temperature range	-10 to +45°C
Storage temperature range	-25 to +70°C
RF connector	BNC plug
Termination	50 $\Omega$
Length of connecting cables	1.5 m
Coding	12-pole Tuchel-type plug
Weight	0.2 kg

#### Accessories supplied

1 Manual	
1 Kit of accessories	241.0613.02
1 Probe tip	241.0913.02

#### Recommended extra for both probes

BNC adapter URV-Z	241.1110.02
-------------------	-------------

\*) Voltage indication on ESH2 and ESH3 is corrected automatically

## Field-strength measurements

The active Rod Antenna HFH2-Z1 is particularly suitable for measuring the electrical components of field-strengths and also for general use as a receiving antenna. When measuring the magnetic component in the frequency range from 10 kHz to 30 MHz, the best choice is the active Loop Antenna HFH2-Z2. The active Loop Antenna HFH2-Z3 is designed for sensitive measurements in the frequency range from 10 kHz to 150 kHz (1 MHz). The Inductive Probe HFH2-Z4 is particularly handy for determining the magnetic component.

## Specifications

<u>Rod Antenna HFH2-Z1</u>	335.3215.52
Frequency range	10 kHz to 30 MHz
Conversion ratio *) (field-strength → voltage)	20 dB related to 1/m
Error of conversion ratio	< 1 dB
Lower limit of measurement range (frequency-dependent, at 200 Hz IF bandwidth and average detection)	< +15 to -10 dB (μV/m)
Upper limit	140 dB (μV/m)
Source impedance	50 Ω
Max. output voltage into 50 Ω	1 V
Current consumption (+10 V, varies with output level)	< 40 mA
Connectors:	
RF	BNC socket
Supply and coding	12-pole Tuchel-type socket
Length of connecting cables	10 m
Operating temperature range	-10 to +55°C
Storage temperature range	-25 to +70°C
Dimensions:	
Height of rod (with amplifier)	1.1 m
Diameter of counterpoise	2.5 m
Weight (in transport case, without cables)	8 kg

## Accessories supplied:

1 Manual	
1 Coaxial cable (10 m)	335.3609.00
1 Power/coding cable (10 m)	335.3596.00
1 12-pole Tuchel-type socket	018.5079.00

\*) Conversion ratio is taken into account automatically for field-strength indication on ESH2 and ESH3.

<u>Loop Antenna HFH2-Z2</u>	335.4711.52
Frequency range	10 kHz to 30 MHz
Conversion ratio <sup>*)</sup> (field-strength → voltage)	20 dB related to 1/m
Error of conversion ratio	< 1 dB
Lower limit of measurement range (frequency-dependent, at 200 Hz IF bandwidth and average detection)	
10 kHz to 1 MHz	< +40 to +10 dB (μV/m)
1 MHz to 30 MHz	< +10 to -5 dB (μV/m)
Upper limit	140 dB (μV/m)
Max. output voltage into 50 Ω	1 V
Current consumption (+10 V, depending on output level)	< 40 mA
Connectors:	
RF	BNC socket
Power supply and coding	12-pole Tuchel-type socket
Length of connecting cables	10 m
Operating temperature range	-10 to +55°C
Storage temperature range	-25 to +70°C
Loop diameter	0.6 m
Weight (in transport bag, without cables)	6 kg

Accessories supplied:

1 Manual	
1 Coaxial cable (10 m)	335.3609.00
1 Feeder/coding cable (10 m)	335.3596.00
1 12-pole Tuchel-type socket	018.5079.00

Recommended extras:

Tripod HFU-Z (in transport bag)	100.1114.02
---------------------------------	-------------

<u>Loop Antenna HFH2-Z3</u>	335.6214.52
Frequency range	10 kHz to 150 kHz (1 MHz)
Conversion ratio <sup>*)</sup> (field-strength → voltage)	10 dB related to 1/m
Error of conversion ratio	< 1 dB
Lower limit of measurement range (frequency-dependent, at 200 Hz IF bandwidth and average value)	
	< +5 to -5 dB (μV/m)
Upper limit	140 dB (μV/m)
Source impedance	50 Ω
Max. output voltage into 50 Ω	3 V
Current consumption (+10 V, depending on output level)	< 50 mA

\*) Conversion ratio is taken into account automatically for field-strength indication on ESH2 and ESH3.

Connectors:

RF	BNC socket
Supply and coding	12-pole Tuchel-type socket
Length of connecting cables	10 m
Operating temperature range	-10 to +55°C
Storage temperature range	-25 to +70°C
Outer perimeter of loop	2.4 m
Weight	
(without transport bag, w/o cables)	17 kg
(with transport bag, without cables)	43 kg

Accessories supplied:

1 Manual	
1 Coaxial cable (10 m)	335.3609.00
1 Feeder/coding cable (10 m)	335.3596.00
1 12-pole Tuchel-type socket	018.5079.00

Recommended extras:

Tripod HFU-Z (in transport bag)	100.1114.02
---------------------------------	-------------

Inductive Probe HFH2-Z4

	338.3016.52
Frequency range	100 kHz to 30 MHz
Conversion ratio <sup>*)</sup> (field strength → voltage)	80 dB
Error of conversion ratio	< 6 dB
Source impedance	50 Ω
RF connector	BNC plug
Length of connecting cables	1.0 m
Coding	12-pole Tuchel-type plug
Operating temperature range	-10 to +55°C
Storage temperature range	-25 to +70°C
Dimensions (diameter/height)	50 mm/20 mm
Weight (with cable)	0.3 kg

Accessories supplied:

1 Manual
----------

\*) Conversion ratio is taken into account automatically for field-strength indication on ESH2 and ESH3.

## Radio interference measurements

When measuring noise voltages at AC-supply-connected devices causing radio interference, a circuit is required to provide the following: that the AC supply voltage is applied to the test item, that the AC supply represents a defined source impedance to the test item, that noise voltages in the AC-supply line do not reach the test circuit and that the noise voltage produced by the test item is defined and forwarded to an adequate test receiver for measurement (e.g. ESH2/ESH3).

The Artificial Mains Network ESH2-Z5 to VDE 0876 and CISPR 3 respectively, meets these requirements.

It consists of air-core inductors and includes a circuit to simulate the electrical characteristics of a human hand, as well as a choke for the non-fused earthed conductor. A built-in blower with separate power supply ensures cooling either continuously or at intervals with automatic switching (selectable).

This Artificial Mains Network can be remote controlled when used in an IEC-bus system via a Code Converter e.g. PCW.

All other accessories which may be useful with interference measurements are mentioned under the relevant headings in this Technical Information (please refer also to table on page 10).

### Specifications

<u>Artificial Mains Network ESH2-Z5</u>	338.5219.52
Frequency range	10 kHz to 150 kHz (30 MHz)
Impedance	to VDE 0876 and CISPR 3 (50 $\mu$ H + 5 $\Omega$ )/50 $\Omega$
Error of impedance (magnitude)	< $\pm$ 20 % (to VDE 0876 and CISPR 3)
Permanent current	4 x 25 A
Max. current (short period)	4 x 50 A
Cooling (automatic switching)	built-in blower
AC supply outputs for test item:	
2 x 16 A	Socket with earthing contact
4 x 32 A	Cekon-type socket
RF output	BNC socket
Remote-control input	50-pole Amphenol socket
Operating temperature range	-10 to +45°C
Storage temperature range	-25 to +70°C
Dimensions (W x H x D)	492 mm x 294 mm x 603 mm
Weight	25 kg

### Accessories supplied:

1 Manual	
1 Power cable	025.2365.00



#### Recommended extras for programmed measurements

1 Code Converter PCW	244.8015.92
1 Process Controller PPC	343.3510.16

#### Other Accessories

The ESH2 can be operated from a 24-V DC supply via the 24-V Adapter ESH2-Z4. This Adapter can be inserted at the rear of the instrument in the place of the power or battery section.

#### Specifications

<u>24-V Adapter ESH2-Z4</u>	338.4512.02
Input voltage range (proof against supply reversal)	+18 V to +32 V
Input connector (supplied with mating socket)	6-pole standard male
Output voltage range	+12.5 V $\pm$ 0.5 V
Output connector	4-pole special socket
Max. output current (short-circuit-proof)	1.5 A
Operating temperature range	-10 to +45°C
Storage temperature range	-25 to +70°C
Dimensions (W x H x D)	205 mm x 172 mm x 50 mm
Weight	about 1 kg

#### Accessories supplied:

1 Manual	
1 Mating connector	018.6946.00

The ESH2 can be converted into a 19" plug-in unit of 4 units height by means of

<u>19" Adapter ESH2-Z6</u>	338.4312.02.
----------------------------	--------------

For operating the subassemblies, which are in the form of plug-in cards, outside the unit during servicing, a

<u>Service Kit ESH2-Z7</u>	338.4112.02
----------------------------	-------------

is provided.

It consists of

- 1 48-pole flexible adapter cable
- 7 coaxial connecting cables.

